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ABSTRACT

The purpose of this study was to examine the effect of the study of organizers, directed reading activity (DRA) and SQ3R, on the immediate and delayed recall of social studies materials. Eighty-four seventh-grade students from an intermediate school participated in this study. The results of the study indicated that the DRA technique was an effective organizer of seventh-grade social studies material for the poor readers of this group. Recommendations for further research include the use of a larger population and an extended practice period to reinforce the learned skills. (Author/RB)

# THE EFFECT OF DRA AND SQ3R ON THE IMMEDIATE AND DELAYED RECALL OF SEVENTH-GRADE SOCIAL STUDIES MATERIAL

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# CHAPTER I

# INTRODUCTION

## Background of the Problem

Reading remains the center of the learning process in spite of all the twentieth-century advances in the field of the audiovisual (Schleich, 1971). Education in the secondary school is still heavily geared to the printed page. For this reason, giving students the skills to study effectively should be the foremost concern of the content teacher.

Before a student is able to comprehend content material, he must have developed certain minimal basic skills. Among these skills are the ability to get meaning from what is read, to organize and outline mentally, and to set purposes for reading (Marksheffel, 1969).

Research and experimentation on how to get students to master these skills has been attempted for almost half a century. Early efforts at the University of Michigan on the value of skimming suggest that previewing might be of some significance (McClusky, 1934).

The research of Hall and Robinson (1945) indicated that there are different reading skills for prose and non-prose materials. They suggested that each of these skills

is in itself a composite of different subskills, abilities, and attitudes.

Experiments at the University of Illinois supported the hypothesis that learning and retention of unfamiliar but meaningful verbal material can be facilitated by the introduction of organizers (Ausubel, 1960). During an eight-week summer program of study skills at the University of Milwaukee, a study of progress indicated that underachieving freshmen of high learning capacity could significantly improve reading-study skills, but without guided follow-up, practice, and application, the gains are largely temporary (Bahe, 1969).

The difficulty of arriving at some sort of conclusive evidence of the value of teaching study skills is due to the fact that the research studies vary in the adequacy of controls and the appropriateness of the statistical analyses (Bahe, 1969).

Most of the research related to study skills has been done on the high school or college level. Today's junior high school student also faces an increased load of content reading as the change from a self-contained classroom to a departmentalized program is made. Experimentation in how to cope with a variety of reading tasks effectively seems important for this age level also.

## Statement of the Problem

The purpose of this study was to determine if instruction in the SQ3R study technique and DRA presentation

would result in improved social studies comprehension on seventh-grade level.

The following hypotheses were tested:

Hypothesis 1. There will be no significant difference in comprehension scores on immediate recall of social studies material between students using DRA, students using SQ3R, and students using reading only as a study technique.

Hypothesis 2. There will be no significant difference in comprehension scores on delayed recall of social studies material between students using DRA, students using SQ3R, and students using reading only as a study technique.

Hypothesis 3. There will be no significant difference in immediate and delayed recall when students are grouped into the top 27% and the bottom 27% according to intelligence.

Hypothesis 4. There will be no significant difference in immediate and delayed recall when students are grouped into the top 27% and the bottom 27% according to reading comprehension scores.

## Importance of the Study

The knowledge that study organizers can aid in comprehension of factual material should be of importance to both the reading teacher and the content teacher. Because of the increasing amount of material presented to the student in junior high school, discovering an effective study organizer should be of paramount importance to both the

learner and the instructor.

Over the years, a number of techniques have been developed and researched. Of these, a widely used and often imitated approach to textbook mastery is the SQ3R method originated by Francis Robinson (Harris, 1970). Another technique is DRA, or Directed Reading Activity, traditionally used by elementary teachers in presenting reading lessons. The literature differs on the value of study techniques and organizers. The purpose of the current experiment was to contribute some knowledge to this discussion.

## Definitions of Terms

For the purposes of this study, terms are defined in the following manner:

Comprehension is the raw score obtained by the student on the test administered after the selection has been read.

Immediate recall is the raw score obtained on the comprehension questions of the testing instrument immediately after completion of reading.

Delayed recall is the raw score obtained on the comprehension questions of the testing instrument after the lapse of one week.

DRA or Directed Reading Activity refers to the traditional method of teaching a reading lesson involving the steps of preparation, vocabulary, silent reading, word

development, rereading, and reinforcement.

SQ3R refers to the study technique developed by Robinson based on the steps of survey, question, read, recite, and review.

Reading assignment refers to the selection, "Over the Alps," found on pages 60 and 61 of the Controlled Reading Study Guide F, published by Educational Developmental Laboratories (1964).

Testing instrument refers to the 20 questions based on the material of reading assignment. These 20 questions were used to check immediate and delayed recall.

## Limitations of the Study

A total of 84 students participated in the study. A larger population or one reflecting a different socio-economic status might have yielded different results. The time allowed for the current study prohibited instruction and examination of results over a prolonged period of time. The population was confined to seventh-grade students and, therefore, the results might be considered applicable to this age group only.

## CHAPTER II

## REVIEW OF THE LITERATURE

For many years it has been realized that content reading demands skills not taught in the basal reading program, and yet this special training is still lacking in most schools (Spache, 1963). This review of the literature will examine the problem of content reading emphasizing the findings of research on the value of study organizers.

### Reading in the Content Areas

Academic success depends on the ability to cover subject matter rapidly with understanding and recall it when necessary for exams, reports, and discussions. Students who are successful in reading class may find that only frustration results when they are faced with the content matter of the text (Oliastro, 1970).

One of the subjects most demanding in reading time is social studies. Perhaps in no other subject is comprehension such a complicated process, for it involves the ability to organize thoughts, recognize main ideas and detail, and identify key words and concepts (Strang, 1957). Herman (1969) feels that grave reading problems exist for all students of social studies except for a few highly

sophisticated readers. Surveys of pupil preferences for the learning activities commonly used in social studies show most students unfavorably disposed toward reading tasks and hostile toward those classes in which reading the text is the dominant mode of learning.

Reasons for students' negative feelings toward social studies are based on the belief that the [illegible] yes much to be desired in organization and clarity of expression (Page, 1969). Vocabulary is considered difficult because of the frequency of technical terms, and often general vocabulary words have different meanings in social studies context. Students feel indecisive about how to study and retain information.

While it may be true that some textbooks lack clarity of presentation, the unquestionable truth is that many students approach the study task without the necessary skills. Often students cannot describe how they study for tests except to say that they read through the book (Page, 1969).

One of the poorest but most widely used methods of studying a textbook assignment is to read it through and, then, if time permits, read it through again. Students using this method are often unable to recite in class although they may recognize the correct answer when they hear it (Wrenn & Larsen, 1941).

A study with 1,500 freshmen at Harvard supports the observation that most students just "plunge in and read"

(Perry, 1959). A chapter in social studies was assigned to the freshmen who were directed to study it as if they would have two hours to complete it. After 22 minutes, the students were interrupted and asked to make a brief statement telling what the chapter was about. Only 150 of the 1,500 had done any exploring beyond the page on which they were reading, and many of these had looked ahead only to estimate the length of the chapter. Of the total, only 15 could give a general view of the direction of the chapter.

The task students face is that of converting raw data into knowledge. If textbooks are to be of any help, then students should be taught how to extract information from them effectively (Pauk, 1966).

In recognition of this need, there has been an increased tendency of colleges and universities to offer study skills courses. A 1953 survey reported that over 90% of United States colleges then offered some kind of skills course, and 10% required such a course of freshmen (Entwistle, 1960). Content of these courses varied from active teaching of study mechanics to supervised practice to individual counseling (Weigel & Weigel, 1967).

Varying degrees of success have been reported with study skills programs. Berg and Rentel (1966) note a lack of agreement as to what study techniques should be taught, and cite evidence to indicate that both failing and successful students use about the same study skills. They do conclude, however, that instruction in study skills does

produce significantly higher academic scores.

At the University of Wisconsin, freshmen took part in an eight-week summer school program of study skills. The indication was that underachieving students of high learning capacity can significantly improve reading-study skills in a course of this type but, without guided follow-up, practice, and application, gains are largely temporary (Bahe, 1969).

Study Skills

The term study skills is a fairly recent addition to the vocabulary of reading instruction. Unlike "word recognition" and "comprehension" which have been used for some time, the expression "study skills" is a comparatively new term and identifies a new concept. This may explain why there is some confusion over the definition and identification of study skills. Some specialists define these skills as habits, attitudes, or states of mind that are conducive to study; some identify them by their function. Herber (1969) says that study skills are work skills that produce useful knowledge for the learner. They are reading skills especially adapted to execute particular tasks. They help develop, remember, and use ideas.

Smith (1963) views study skills as those that form an integral part of the reading process, but are used when application of the content is desired or, more simply, skills used when there is intention to do something with

the content read. She explains that if a student reads a story for enjoyment, he is not using a study skill. If he reads for the purpose of gathering information to be later used in the classroom, he is employing a study skill.

Russell (1965) includes selecting, locating, and evaluating information in study skills and, in addition, the ability to adjust rate to purpose.

Dawson (1971) notes that the importance of using paragraph clues as aids to comprehension is based on the widely accepted approach to paragraph interpretation consisting of seeking the principal thought and supporting details. This assumes that every paragraph is developed around one essential idea and that this idea is found in the first sentence, the last sentence, or occasionally only inferred.

Most reading specialists agree that students must be taught study skills to help them with comprehension. Study skills are valuable because they act as organizers for the factual material of the content.

Organizers

Students cannot retain large masses of information without some system of meaningful organization (Christensen & Stordahl, 1955). It is therefore assumed that if any organizing system is used, students will learn more than if the material is studied without such a pre-learning activity.

Learning and retention can be facilitated by the use of advance organizers. Organizers have been found to be very effective for the factual material which is presented in the social studies area. Use of such organizers produces a greater economy of learning effort, and their use is much more effective when introduced at the beginning of the learning task (Ausubel, 1963).

In an experiment at the University of Illinois, Ausubel (1960) tested the hypothesis that learning and retention of unfamiliar but meaningful verbal material can be facilitated by the advance introduction of relevant subsuming concepts or organizers. One hundred and twenty undergraduates were tested on their ability to learn new material using advance organizers. Comparison of the mean retention scores of the experimental and control groups after three days gave significant support to the hypothesis.

Not all of the literature presents such a positive picture of the advantages of advance organizers. An experiment with basic trainees at Sampson Air Force Base using selected revised passages from Air Force correspondence courses failed to show significance. The material was revised to include an outline at the beginning of the passage, underlining of main points, and headings in statement form and in question form. Comparison of experimental and control groups shows no significant differences between organizing aids for either immediate or delayed retention

(Christensen & Stordahl, 1955).

An experiment conducted at Bell Laboratories sought to determine if test-like questions have generalized facilitating effects on learning from written instructional material. The results generally support the hypothesis, but it was found that test questions presented after reading were effective for recall of main idea and specific detail while those presented before reading were found to be more effective for recall of specific detail (Rothkoff, 1966).

McClusky (1934), using college students, conducted an experiment to determine the effects of preliminary skimming on reading comprehension as compared to the effect of preliminary skimming of headings and summarizing. Both groups were able to read faster and comprehend more as a result than were control groups.

At the University of California at Berkeley, 212 ninth-grade students in two public high schools participated in an experiment to determine if advance questions will produce a facilitative effect. The hypothesis stated that the facilitative effect would be most apparent for the student of low verbal ability, but the findings revealed that the use of advance organizers had no facilitative effect on the "less able" student while producing a general enhancement of learning for the average student (Allen, 1970).

It can be seen from the literature, therefore, that the precise effect of the use of advance organizers is still not generally agreed upon by reading research.

Types of Study Organizers

The problem of textbook mastery is fourfold: identification of key ideas, retention of these ideas for further recitation and examination, reflection on these ideas and their integration into the student's existing framework of knowledge, and review to counteract forgetting (Pauk, 1963).

Certain study techniques have been developed to cope with the burden of textbook mastery. Some have been in use informally for a long time; others are of more recent origin.

The Gestalt school of psychology emphasizes the value of an initial impression of wholeness before an analytical attack is made on the parts which derive their meaning from the whole. When applied to reading, this thought suggests that a reading of a passage of subject matter should be preceded by a skimming overview (McClusky, 1934).

Other traditional methods of study frequently used are summarizing, outlining, underlining, and notetaking. A combination of these is frequently used.

Summarizing helps establish essential facts and the main ideas in capsule form. It is especially useful for literature, history, or social studies, but not as helpful in areas such as science. The necessary skill required is noting main ideas.

Outlining is another way of organizing information,

closely related to summarizing. It also requires the student to have mastered the skills of identifying the main ideas and recognizing supporting details as well as the ability to discard information that is not relevant. Outlining may be done in sentence or topic form.

Many students use underlining of key words and phrases in the book to organize what they have read. Often this method fails because of the haphazard way in which it is done. It does not show organization of material and fails to stimulate recall. Proper underlining calls for the student to survey and become familiar with the key ideas before reading.

Notetaking is a high level study or integrative reading skill. It may be accomplished in paragraph, sentence, or outline form; it is considered by some to be the best opportunity to organize (Dechant, 1973).

Research has reflected interest in the use of questions which serve as a preview or review. The studies of Washburne (1929) suggest that the best placement is grouping all questions at the beginning of the reading material. Subjects in pre-questioned groups retained significantly more question-relevant information on both immediate and delayed retention tests than did post-questioned and control groups (Boker, 1974). Analysis and evaluation-type questions result in significantly better achievement (Hunkins, 1969).

Questions are useful tools since they are easy to

construct and are flexible. Questions can be used to see if achieved behavior (what the student has memorized) meets the criterion of acceptable behavior (the correct answer). Errors act as negative feedback which controls reading behavior until the students meet the criterion. Questions are therefore a stimulus to the learner (Frase, 1968).

Composites of several formal study techniques include the skimming or surveying process, the stimulus of questions, and one or more of the other informal devices already described. Among the best known of these techniques are DRA and SQ3R.

DRA

There is no one best way to teach reading to all children in all kinds of situations; however, there are some basic principles of reading instruction which have been experimentally appraised and time tested. DRA is one of these (Betts, 1957).

Most reading manuals are organized on the structure of what is commonly known as Directed Reading Activity or DRA. The technique is based on student readiness and is the traditional form of the basal reading lesson (Harris, 1970).

Readiness has been explained as a state of general maturity which allows a student to read without excessive difficulty (Spache, 1970). Directed reading activities include planned experiences or opportunities to prepare

students for various reading tasks as well as to help them continue to grow in order to meet new demands. DRA enables them to learn new words in a certain selection, absorb new ideas and attitudes, and comprehend material thoroughly. This should be a continuous process during the entire reading program even though it is most emphasized in the early school years.

DRA makes certain basic assumptions of the teacher. It assumes that the teacher has set goals; for example, new information to be presented or new skills to be taught. The teacher should have thought through the learner's purpose and determined if he is ready for the new skills to be taught. The reading level of the material should be deemed appropriate.

There are five basic steps in the presentation of DRA:

1. Preparation for reading the selection.
2. Initial silent reading.
3. Comprehension and word recognition development.
4. Rereading part or all of the selection.
5. Reinforcement of new skills and concepts.

Step 1. Preparation for reading the selection. This first step should be an evaluation of the students' experience backgrounds to see if they are similar to that of the author. Preparation for reading should include the introduction of new vocabulary in an oral language situation which also presents variant forms. Vocabulary should

be presented in context, never in isolation. Stimulation of an interest in the subject of the activity should be attempted and a purpose for reading established.

Step 2. Initial silent reading. The first reading should always be silent and for the purposes which have been set. Each student reads until his purpose has been fulfilled. The teacher should remain alert to the symptoms of difficulty and be ready to aid individual students. A child should be urged to apply skills he already possesses to solve reading problems.

Step 3. Comprehension and word recognition development. At the end of the silent reading period, the purposes established in Step 1 should be checked. Clarifications of misconceptions should be done at this time. Emphasis should be placed on the skills required for inferential and critical thinking. Before the next step commences, purposes for rereading should be established; these should be new and different from the original ones.

Step 4. Rereading part or all of the selection. Rereading may be silent or oral; silent to get the main idea or oral to share this with others. If the teacher's basic assumptions were correct, facility in handling the rereading should be improved. Students are now reading at their independent level whereas they had been reading at an instructional level in Step 2. At the independent level, students can be expected to apply their newfound skills more quickly. Increases in speed should now be evident.

Step 5. Reinforcement of new skills and concepts. Meaningful follow-up activities should be provided to reinforce new concepts, vocabulary, and thinking skills. Newly learned skills should be tested in differing contexts on an independent basis. These can be done through experiments, field trips, sharing material from home, library books, reference materials, newspapers, and magazines. Independent application of new skills results in improved speed and reading for communication (Kress, 1964).

SQ3R

Research indicates that an effective study technique should include a survey or skimming of headings and summaries before starting to read. Introductory statements are valuable in giving the reader a mental set that aids greatly in interpretation. Such statements usually give the purpose of the author or a preview of the contents of the selection and may indicate its plan or organization (Dawson, 1971). Asking questions before starting a selection has also been found to help comprehension.

Robinson (1961) decided to create a study organizer based on the findings of research. Such a technique would have to satisfy the demands of school study and please the student with its effectiveness. Students preferred methods that would help in selecting what must be known, comprehending facts quickly, memorizing them, and reviewing for exams. The method had to be more efficient than rereading

the lesson; it had to be easy to learn.

In his work with college students, Robinson (1941) experimented with various methods while he added refinements and suggestions. He included headings when he found comprehension increased with their addition. His final result was the SQ3R method which consists of five basic steps:

Step 1. Survey. Students glance over all the headings in the chapter.

Step 2. Question. Students then turn headings into purpose-setting questions.

Step 3. Read. The passage is then read with the questions in mind.

Step 4. Recite. Students try to recite the answers to their questions without referring to the assignment.

Step 5. Review. After the lesson has been read through, students look over their notes and try to recall the main points of the lesson.

Robinson's own presentation of the method appears in Appendix A.

Based on the observations of its effectiveness and on experimentation, many well-known reading specialists (Harris, 1970; Niles, 1965; Spache, 1963; Strang, McCoullough, & Traxler, 1967) have recommended the use of SQ3R as a study aid.

Robinson (1961) cites two experiments in which its

effectiveness was tested. The subjects in a "how-to-study" class were first tested on reading rate and comprehension, then shown how to apply the SQ3R method. They were retested on a reading task of similar difficulty. Before SQ3R training, the average rate of reading was at the thirty-fourth percentile; after training, it was at the fifty-sixth percentile. Before SQ3R training, the average accuracy of comprehension was at the forty-third percentile, and after training it was at the fifty-third percentile.

In the second Robinson experiment, two quizzes of equal difficulty were prepared. For the first quiz, the students were allowed to study using their own selected methods but, for the second, they were told how to predict questions. The average number of errors on the first quiz was 15, but on the second, it was only six.

Another study undertaken by Donald (1967) determined the effect of SQ3R on reading and social studies achievement in seventh grade. The study was done on two equivalent groups of 31 students in a Minnesota parochial school. The two groups were equated on the basis of M.A., I.Q., reading, geography, and history scores. Coordinated Scales of Attainment were used to equate the groups. Mean differences were found to be insignificant. During the year, SQ3R was taught to the experimental group; the control group received the traditional treatment including visual aids. At the end of each semester, the subjects were tested on a prevalidated instrument. The May testing

showed differences of 6.69 in geography and 7.08 in history, a significant difference at the .01 level of confidence in favor of the treatment group.

Selection of an Organizer

Both DRA and SQ3R have been employed as methods of organizing material for student mastery. DRA has been a traditional method for teaching subjects which involve heavy reading loads such as social studies, and SQ3R has been used in much the same fashion. The difference in their relative value as organizers is little known because of the fact that SQ3R has been more widely subjected to testing than has DRA.

Willmore (1967) compared four methods of studying college textbooks: reading, underlining, outlining, and SQ3R. Underlining scored higher than reading, outlining, and SQ3R, but SQ3R scored higher than outlining. While not conclusive evidence that SQ3R is the most effective tool, it does support the belief that it is a worthwhile aid.

Research has also shown that a group of college students using SQ3R with a six-week practice period scored higher on comprehension than a group using reading only or own best study methods (Niple, 1968).

Harris (1970), while admitting that the technique has not been subjected to much experimentation, feels that the system is well grounded in the principles of learning psychology and cites its wide use as a study program.

Since Robinson's method was designed primarily for history, social studies, and similar prose material in a textbook format (Berg & Rentel, 1966), and since experimentation with the system has not been extensive on the junior high level, further investigation of its effectiveness as an organizer would seem desirable.

On the other hand, DRA, which has been employed unchallenged for many years, has had little experimentation to test its effectiveness. At least one authority (Veatch, 1966) suspects that children have learned in spite of DRA and classifies the method with many other elements of basal reading in which there is no research proof of validity.

## Conclusion

The evidence in the literature has pointed to the need for a study organizer on the secondary level to meet the needs of a burgeoning social studies content. While there are several methods available, both SQ3R and DRA have been demonstrated to be valuable for this content area. However, the research so far as been predominantly on the high school and college levels even though the content reading problem exists also at the seventh- and eighth-grade levels. It therefore seemed important to investigate the effectiveness of both methods with junior high school students.

# CHAPTER III

## PROCEDURE

This chapter describes the sample, the construction of the instrument, the administration of the tests, and the design and treatment of the data.

### Description of the Sample

The sample consisted of 84 students from Eisenhower School, an intermediate school in the Bridgewater-Raritan school district of Somerset County, New Jersey. Eisenhower School is situated in a neighborhood in which the mean income is $15,781 per year. Eighty percent of heads of households are high school graduates pursuing professional or technical careers (1970 Census).

Participants in the study were randomly assigned to two treatment groups and one control group by using a table of random numbers.

Intelligence was determined by the Lorge-Thorndike Intelligence Test, Form 1, which all subjects had taken in October 1973. The reliability coefficients for this test range from .83 to .91. The test correlates well with scholastic achievement and with I.Q. scores of other intelligence tests (Buros, 1972). The mean score for the control

group was 101.4; for the DRA group. 101.0; and for the SQ3R group, 102.2.

Reading levels were determined from scores on the comprehension subtest of the Iowa Tests of Basic Skills, Form 3, which had been administered to all subjects in October 1974. Acceptable reliability coefficients of .84 to .96 have been established for this test (Buros, 1972). The mean comprehension score of the control group was 6.3; of the DRA group, 6.5; and of the SQ3R group, 6.5. The scores of all subjects are listed in Appendix B.

Construction of the Instrument

The instrument used to teach the study organizers and to check comprehension was the Controlled Reading Study Guide F by S. E. Taylor and H. Frackenpohl, edited by C. E. White, and published by the Educational Development Laboratories, Huntington, New York (1964). The selection used for the reading assignment was "Over the Alps" by White which is found on pages 60 and 61. The teacher's edition of this publication stated that the reading level was seventh grade and application of the Fry formula supported this evaluation. The selection was 915 words in length. The material was edited to include five headings which were converted into questions by the SQ3R group in their treatment. The edited material was used by all three experimental groups.

Following the reading assignment were 10 multiple-

choice comprehension questions, each requiring the selection of one of four possible answers. To these were added 10 additional teacher-made questions similarly constructed. This material was used as a comprehension check for all three groups.

In October, a pilot study was run using 21 seventh-grade students from the same school who did not participate in the study. Reliability of the instrument was then determined at .72 by application of a rational equivalence formula.

Administration of the Test

DRA. Subjects were told that they were going to have a reading lesson. They were then prepared for the selection by eliciting responses about their experience background. The Alps Mountains and the city-states of Rome and Carthage were located on a map. Subjects were encouraged to volunteer information about Hannibal which they remembered from other sources. The following words were presented in context and defined: military, barbarian, trumpeting.

Subjects were then instructed to read silently to find out why Hannibal was considered a great military leader. At the conclusion of the silent reading, a discussion of the purpose question followed. Subjects recognized Hannibal as a great leader because of his imagination and daring. In the rereading, they were instructed to look for

evidence of these qualities.

The comprehension questions were then given, and students completed them without referring to the reading assignment. One week later, the DRA group met to take the comprehension questions a second time without referring to the reading assignment.

SQ3R. The SQ3R group met and was told that they would have a reading lesson. After they were given the reading task, the steps of SQ3R as described in Chapter II were implemented. At the end of the review period, the testing instrument was administered. Students were not permitted to refer to the reading material or to any notes they had taken. One week later, the SQ3R group met to take the comprehension questions a second time without referring to either notes or the reading task.

Control. When the control group met, the subjects were told that they would have a reading lesson. The group was instructed to read the assignment. As each student finished, he was given the comprehension questions which he answered without referring to the story. One week later, the control group met to take the comprehension questions a second time without rereading the passage.

## Design and Treatment of Data

The experimental design was a modified pretest-posttest design even though both tests were administered after treatments. The test of immediate recall was, in

effect, the pretest, and the test of delayed recall was the posttest.

$$R \quad O_1 \; O_2$$
$$R \; X \; O_3 \; O_4$$
$$R \; X \; O_5 \; O_6$$

In this design, R indicates the random assignment of classes to treatment groups, X represents the exposure of these groups to the experiment variables, and O represents the measurement process.

Raw scores on the testing instrument were used to determine comprehension achievement on both immediate and delayed recall. The mean score of the control group was compared to the mean score of the DRA and SQ3R groups to see if the treatments were significant. An analysis of variance was applied to the test results to determine the effect of DRA and SQ3R on immediate and delayed recall. t Tests were run to compare the means of the top 27% and bottom 27% of the groups arranged according to intelligence and to reading comprehension levels.

Summary

The effect of DRA and SQ3R on the immediate and delayed recall of seventh-grade social studies material was tested in an experiment with two treatment groups and one control group. Eighty-four subjects, randomly assigned, from an intermediate school participated. The instrument which had been previously validated was an EDL controlled

reading lesson. An analysis of variance was run to determine the significance of the treatments. _t_ Tests were employed to compare the means of the experimental groups.

# CHAPTER IV

## FINDINGS AND DISCUSSION

This chapter will report and discuss the findings of the study. The findings related to the hypotheses will be discussed first. These results will be related to the pertinent literature discussed in Chapter II.

### Findings Related to the Hypotheses

The first hypothesis raised the question of the effect of the study organizers DRA and SQ3R on the immediate recall of social studies material. When the study was concluded, the results indicated that both the DRA and SQ3R groups had scored numerically higher on immediate recall than had the control group. The mean raw score for the control group was 9.5; for DRA, 10.5; and for SQ3R, 10.85. When an analysis of variance was applied to these results, an F ratio of 1.15 was achieved. This was not significant at the .05 level of confidence and so the first null hypothesis was accepted.

The second hypothesis raised the question of the effect of the study organizers DRA and SQ3R on the delayed recall of social studies material. When the results of the test were examined, the DRA and SQ3R groups had scored

numerically higher on delayed recall than had the control group. The mean raw score for the control group was 8.60; for DRA, 9.96; and for SQ3R, 10.50. An analysis of variance was applied to these results to determine if there was significance. An F ratio of 2.40 was obtained. Since p = 3.11 (Tuckman, 1972), this result was not significant at the .05 level, and the second null hypothesis was accepted.

Mean raw scores for the three experimental groups on immediate and delayed recall are presented in Table 1. Distributions of scores for these groups on immediate and delayed recall are found in Appendix B.

The third hypothesis raised the question of the effect that the treatments would have on subjects of above-average and below-average intelligence. The results of the experiment were then analyzed in terms of intelligence as determined by the Lorge-Thorndike Intelligence Test which had been given to all subjects in October of 1973. Each experimental group was divided into the top 27% and the bottom 27% according to their intelligence quotient scores. A comparison of the mean raw scores of the three experimental groups is presented in Table 2.

An analysis of variance was applied to the results of immediate recall of the three groups which had been arranged according to I.Q. This analysis yielded an F ratio of .31 for the top 27% of the groups and 1.2 for the bottom 27% of the experimental groups. Since p = 3.47 (Tuckman, 1972), there was no significance at the .05 level

TABLE 1

MEAN RAW SCORES OF CONTROL, DRA, AND SQ3R GROUPS ON TESTS OF IMMEDIATE RECALL ($T_1$) AND DELAYED RECALL ($T_2$) ($N$ = 84)

| | Mean raw score $T_1$ | S.D. | Mean raw score $T_2$ | S.D. | Loss in comprehension[a] |
|---|---|---|---|---|---|
| Control ($n$ = 28) | 9.50 | 3.23 | 8.60 | 3.23 | .90 |
| DRA ($n$ = 28) | 10.50 | 3.23 | 9.96 | 3.06 | .54 |
| SQ3R ($n$ = 28) | 10.85 | 3.95 | 10.50 | 3.52 | .35 |

[a]Loss in raw score after lapse of seven days.

TABLE 2

COMPARISON OF MEAN RAW SCORES OF EXPERIMENTAL GROUPS ON TESTS OF IMMEDIATE AND DELAYED RECALL ARRANGED ACCORDING TO INTELLIGENCE
(N = 48)

| | Control | | DRA | | SQ3R | |
|---|---|---|---|---|---|---|
| | $T_1$[a] | $T_2$[a] | $T_1$ | $T_2$ | $T_1$ | $T_2$ |
| Low 27% (n = 24) | 8.0 | 6.7 | 8.3 | 8.0 | 7.9 | 7.3 |
| High 27% (n = 24) | 12.5 | 11.3 | 13.1 | 12.5 | 14.1 | 13.6 |

[a] $T_1$ Immediate recall.
$T_2$ Delayed recall.

of confidence.

A second analysis of variance was done on the test of delayed recall. The results of this analysis yielded an F ratio of .63 for the top 27% of the experimental groups and .572 for the bottom 27% of these groups. Since p = 3.47 (Tuckman, 1972), these results were not significant at the .05 level. The null hypothesis which stated that intelligence would not be a factor in immediate and delayed recall was therefore accepted.

The fourth hypothesis raised the question of the effect of reading level on the immediate and delayed recall of social studies material. An examination of the reading ability of the subjects was then made to determine the effects of the treatments on poor readers and on good readers. The experimental groups were again divided into the top 27% and the bottom 27% based on their reading scores. These reading scores were obtained from the reading comprehension subtest of the Iowa Test of Basic Skills, Form 3, which had been administered in October 1974. A comparison of the mean raw scores of the three experimental groups divided according to reading ability is presented in Table 3.

An analysis of variance applied to the scores of the experimental groups for the test of immediate recall gave an F ratio of 1.2 for the top 27% and 2.6 for the bottom 27%. Since p = 3.47 (Tuckman, 1972), the results of this test were not termed significant at the .05 level.

TABLE 3

COMPARISON OF MEAN RAW SCORES OF EXPERIMENTAL GROUPS ON TESTS OF IMMEDIATE AND DELAYED RECALL ARRANGED ACCORDING TO READING LEVEL ($N$ = 48)

| | Control | | DRA | | SQ3R | |
|---|---|---|---|---|---|---|
| | $T_1$[a] | $T_2$[a] | $T_1$ | $T_2$ | $T_1$ | $T_2$ |
| Low 27% ($n$ = 24) | 7.0 | 6.13 | 10.0 | 10.0 | 8.1 | 7.6 |
| High 27% ($n$ = 24) | 11.5 | 11.7 | 11.7 | 11.1 | 13.5 | 13.6 |

[a] $T_1$ Immediate recall.
$T_2$ Delayed recall.

When an analysis of variance was done on the scores of the test of delayed recall, an F ratio of 7.6 was obtained for the top 27% and an F ratio of 6.6 was obtained for the bottom 27%. Since p = 3.47 (Tuckman, 1972), the results of the test of delayed recall of the top 27% was termed not significant. However, the F ratio of 6.6 of the bottom 27% exceeded the p of 3.47 and these results were determined significant at the .05 level of confidence.

These findings did not lend support to the fourth hypothesis which stated that reading level would not be a factor in determining the effect of the study organizers DRA and SQ3R.

In order to test for significance between means of low achieving readers, t tests for differences between the means were employed (Garrett, 1966). A t test computed for the difference between the control group and the SQ3R group yielded an F ratio of 1.96 which was not significant at the .05 level. A second t test was then conducted to test for significance between the means of the DRA group and the control group. A resulting F ratio of 3.17 indicated significance at the .05 and .01 levels of confidence. Results of the t tests to compare the means of the slow readers of the control, DRA, and SQ3R groups are presented in Table 4.

Relation to the Literature

Most of the research on the value of organizers or study techniques has been done on the high school and

TABLE 4

SUMMARY OF *t* TESTS FOR SIGNIFICANCE BETWEEN MEAN RAW SCORES ON TEST OF DELAYED RECALL FOR LOW 27% OF EXPERIMENTAL GROUPS ARRANGED ACCORDING TO READING LEVEL
(*N* = 16)

| | Control | DRA | Control | SQ3R | DRA | SQ3R |
|---|---|---|---|---|---|---|
| Mean scores | 6.13 | 10.00 | 6.13 | 7.60 | 10.00 | 7.60 |
| Standard deviations | 2.46 | | 1.53 | | 2.33 | |
| Standard error of means | 1.23 | | .77 | | 1.77 | |
| Difference between means | 3.87 | | 1.47 | | 2.40 | |
| *F* ratio | 3.17 | | 1.96 | | 1.99 | |

*F* (*df* - 15) = 2.13 .05
= 2.95 .01

college level with little information available about junior high school subjects. The most significant study done with seventh-grade students was that of Donald (1967) whose results were conclusive on the value of the SQ3R technique used to master social studies material, but whose population and duration of study differed from the current study. The smaller and more selective sample and the year's time spent in teaching the technique would have been expected to yield different results.

The current study did support the research of Washburne (1929). Though the findings were not statistically significant, the SQ3R group, which relied more on preview questions, scored numerically higher on delayed recall than did the DRA or control groups. Since both DRA and SQ3R groups had higher scores than the control group on both immediate and delayed recall, results were somewhat similar to Frase's study (1968) which found that questions are a stimulus to the learner.

Christensen and Stordahl (1955) also adapted reading passages to include outlines, summaries, and headings. When that study, done with Air Force trainees, was completed, no significant gain on either immediate or delayed recall for the treatment groups was reported. The current study agreed with these findings for the SQ3R group, but did not agree for the slow readers of the DRA group.

The study done by Allen (1970) found that the use of advance organizers had no facilitative effect on the

"less able" student. The current study resulted in somewhat different findings for the poor readers of the DRA group.

Explanation of Results

Scores of the DRA and SQ3R groups were higher on immediate and delayed recall, but not high enough to be termed significant.

The Donald study (1967), which showed significant differences at the .01 level of confidence, was carried out over the course of a year. Motivational devices such as posters to foster a better understanding of the concepts, periodical articles stressing the success of SQ3R, and notebooks and questionnaires on the value of the method were employed to keep the interest of the subjects at a high level. This procedure could have affected the findings. Because of the availability of a larger amount of time, Donald was able to provide the guided follow-up, practice, and application that Bahe (1969) has determined are necessary if gains are to be permanent.

The time allocated to this study precluded guided follow-up and reinforcement necessary for the mastery of these techniques. A longer practice period might have provided more motivation and reinforcement which could have yielded significant results on all reading levels.

As was noted, scores of the slow DRA readers showed significant retention of the material they had mastered.

Since DRA is based on principles of early reading instruction (Betts, 1957), and is a traditional component of the basal reading lesson (Harris, 1970), it is possible that the poorer readers reacted favorably to this guidance. In addition, poorer readers were probably more familiar with this structure, having used basal readers more recently.

The DRA approach was more successful with poor readers. Implications of this discovery will be discussed in Chapter V.

# CHAPTER V

## SUMMARY, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter will summarize the results of the study, draw conclusions from these results, and offer suggestions for additional research with study organizers.

### Summary

The problem considered in this study was the effect of the study organizers, DRA and SQ3R, on the immediate and delayed recall of seventh-grade social studies material. The effect of intelligence and reading levels on the results of the experiment was also examined.

While the treatment groups scored numerically higher than the control group, no statistical significance was found on tests of immediate and delayed recall. When the three experimental groups were arranged according to intelligence, no statistical significance was determined. However, when the three experimental groups were arranged according to reading level, the bottom 27% of the DRA showed significance on the test of delayed recall at the .01 level of confidence.

Conclusions

A significant outcome of the current study was the performance of the bottom 27% of the DRA group on the test of delayed recall when the groups were arranged according to reading level. When a t test was computed between the mean of this group and the control group, significance was found at the .01 level of confidence.

The bottom 27% of the DRA group represented the poorer readers of this group, namely, those whose reading comprehension scores were lowest when this group was arranged according to level of reading comprehension. The bottom 27% of the DRA group scored better than their counterparts in the SQ3R and control groups in that they retained more of what they had learned. These results are somewhat different from the findings of Allen (1970) who tested the effect of advance organizers on ninth-grade students of history. Allen reported that the introduction of organizers had no general facilitative effect on the "less able" but did provide a general enhancement of learning for the average student. Since the Allen study was done with ninth-grade students and the current study was done with seventh-grade students, it might be concluded that grade level could have been a factor in the difference. Younger students could have responded more favorably to the organizing effect of the DRA treatment since they had been exposed to this technique more recently in basal readers.

The current study was in basic agreement with the

research done by Bahe (1969). That study found that gains made during an eight-week summer program of study skills for underachieving freshmen at the University of Wisconsin would be only temporary without continuous follow-up and application of the skills that had been learned. If the time permitted for this study had been longer, a practice period with the skills learned in DRA and SQ3R could have been included, and the results might have been more definitive with these treatment groups.

Suggestions for Further Research

Replication of this study with a larger population is suggested. While the performance of the bottom 27% of the DRA group arranged according to reading level was termed significant, this group represented a very small segment of the total sample. If repetition of the experiment with a larger population yielded similar results, then the consequences of this finding for poorer readers would be more evident. Since DRA is a teacher-directed organizer, the need for guidance of poorer readers becomes apparent. Information obtained about organizers which are effective with this type of reader should be useful to content teachers and reading teachers.

Repetition of this study with a longer period of instruction and provision for guided follow-up before final evaluation is suggested. The Donald study (1967), which yielded significant results for the SQ3R treatment group,

was carried on over the course of a year. The findings of Bahe (1969) have indicated that the gains made during study skills programs are only temporary without follow-up and practice. If the time allowed for the current study could be extended, then provision could have been made for additional instruction and the results might have been more significant.

It remains to be determined by research whether SQ3R is too advanced a technique for widespread use by students of junior high levels. Once SQ3R has been learned by the student, the implementation of the technique is his responsibility. It does not require any further instruction by a teacher. Because SQ3R requires this internalization, motivation, and higher level reading skills, its use is more widespread by high school and college students. This fact alone may explain the paucity of research on the junior high level. The Donald study remains one of the few research studies done with seventh-grade students. Further experimentation with SQ3R on the seventh-grade level is suggested as an extension of the current study.

Since SQ3R and DRA are effective techniques for organizing factual material to insure retention of main ideas and important supporting details, further research with both of these organizers on different grade levels might be valuable. The current study employed a seventh-grade population. Investigation of the effects of DRA and SQ3R on eighth- and ninth-grade subjects might yield

different results.

The effectiveness of organizers has been studied for almost half a century. Literature has differed on the degree of this effectiveness. It is hoped that the current study has added some information to this discussion.

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# APPENDIX A

## THE SQ3R METHOD BY FRANCIS ROBINSON

# THE SQ3R METHOD

The title for this new higher level study skill is abbreviated in the current fashion to make it easier to remember and to make reference to it more simple. The symbols stand for the steps which the student follows in using the method; a description of each of these steps is given below:

SURVEY 1. Glance over the headings in the chapter to see the few big points which will be developed. Also read the final summary paragraph if the chapter has one. This survey should take no more than a minute and will show the three to six core ideas around which the discussion will cluster. This orientation will help you organize as you read them later.

QUESTION 2. Now begin to work. Turn the first heading into a question. This will arouse your curiosity and so increase comprehension. It will bring to mind information already known, thus helping you to understand that selection more quickly. And the question will make important points stand out while explanatory detail is recognized as such. Turning a heading into a question can be done on the instant of reading the heading, but it demands a conscious effort on the part of the reader to make this query for which he must read to find the answer.

READ 3. Read to answer that question, i.e., to the end of the first headed section. This is not a passive plodding along each line, but an active search for the answer.

RECITE 4. Having read the first section, look away from the book and try briefly to recite the answer to your question. Use your own words and name an example. If you can to this, you know what is in the book; if you can't, glance over the section agair An excellent way to do this reciting from memory is to jot down cue phrases in outline form on a sheet of paper. Make these notes very brief!

Now repeat steps 2, 3, and 4 on each succeeding headed section. That is, turn the next heading into a question, read to answer that question, and recite the answer by jotting down cue phrases in your outline. Read in this way until the entire lesson is completed.

REVIEW 5. When the lesson has been read through, look over your notes to get a bird's eye view of the points and of their relationship and check your memory as to the content by reciting on the major subpoints under each heading. This checking of memory can be done by covering up the notes and trying to recall the main points. Then expose each major point and try to recall the subpoints under it.

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Source: F. P. Robinson, Effective study (New York: Harper, 1961), pp. 29-30.

# APPENDIX B

## SCORES OF SUBJECTS IN CONTROL, DRA, AND SQ3R GROUPS ON READING THE INTELLIGENCE TESTS

## RAW SCORES ON TESTS OF IMMEDIATE AND DELAYED RECALL

INDIVIDUAL SCORES OF SUBJECTS IN CONTROL GROUP

| S | I.Q.[a] | R. L.[b] | V. L.[b] | Test 1[c] | Test 2[c] |
|---|---|---|---|---|---|
| 1 | 109 | 7.2 | 7.3 | 13 | 9 |
| 2 | 105 | 7.7 | 8.4 | 12 | 10 |
| 3 | 98 | 4.6 | 6.4 | 5 | 6 |
| 4 | 120 | 8.5 | 8.4 | 15 | 15 |
| 5 | 110 | 7.5 | 7.2 | 13 | 11 |
| 6 | 118 | 7.5 | 8.0 | 16 | 10 |
| 7 | 92 | 3.5 | 4.6 | 9 | 5 |
| 8 | 108 | 7.5 | 6.2 | 12 | 12 |
| 9 | 110 | 7.6 | 7.9 | 11 | 13 |
| 10 | 106 | 6.0 | 7.5 | 12 | 6 |
| 11 | 79 | 5.5 | 5.3 | 5 | 7 |
| 12 | 84 | 6.3 | 6.0 | 12 | 10 |
| 13 | 109 | 7.7 | 6.2 | 14 | 14 |
| 14 | 118 | 8.6 | 8.5 | 9 | 8 |
| 15 | 107 | 7.9 | 7.0 | 10 | 12 |
| 16 | 102 | 6.9 | 7.1 | 9 | 5 |
| 17 | 92 | 4.2 | 4.6 | 6 | 3 |
| 18 | 93 | 5.9 | 7.5 | 7 | 10 |
| 19 | 102 | 5.5 | 5.2 | 7 | 13 |
| 20 | 94 | 5.5 | 5.1 | 6 | 6 |
| 21 | 98 | 6.0 | 6.6 | 3 | 3 |
| 22 | 116 | 8.8 | 8.1 | 9 | 10 |
| 23 | 94 | 6.3 | 5.6 | 9 | 8 |
| 24 | 83 | 5.2 | 6.2 | 9 | 6 |
| 25 | 92 | 6.1 | 5.7 | 7 | 5 |
| 26 | 96 | 4.0 | 5.3 | 7 | 9 |
| 27 | 102 | 3.6 | 4.2 | 9 | 7 |
| 28 | 102 | 6.9 | 7.1 | 11 | 9 |
| Mean | 101.4 | 6.37 | 6.53 | 9.5 | 8.6 |

[a]Determined by Lorge-Thorndike (October 1973).
[b]Determined by Iowa Test of Basic Skills, Form 3 (October 1974).
[c]Raw scores on comprehension questions.
Test 1 = Immediate recall.
Test 2 = Delayed recall.

INDIVIDUAL SCORES OF SUBJECTS IN DRA GROUP

| S | I.Q.[a] | R. L.[b] | V. L.[b] | Test 1[c] | Test 2[c] |
|---|---|---|---|---|---|
| 1 | 112 | 8.0 | 8.2 | 12 | 11 |
| 2 | 121 | 8.4 | 8.5 | 14 | 10 |
| 3 | 91 | 5.8 | 6.0 | 13 | 10 |
| 4 | 93 | 7.8 | 7.8 | 8 | 7 |
| 5 | 108 | 4.0 | 6.0 | 11 | 10 |
| 6 | 109 | 5.5 | 6.4 | 8 | 7 |
| 7 | 94 | 7.5 | 5.2 | 5 | 5 |
| 8 | 110 | 6.5 | 6.0 | 13 | 12 |
| 9 | 125 | 8.7 | 7.4 | 16 | 17 |
| 10 | 106 | 6.4 | 6.0 | 12 | 12 |
| 11 | 100 | 4.8 | 5.7 | 12 | 11 |
| 12 | 118 | 8.3 | 8.4 | 12 | 13 |
| 13 | 113 | 5.8 | 6.6 | 11 | 12 |
| 14 | 100 | 6.5 | 6.6 | 8 | 7 |
| 15 | 101 | 6.1 | 5.0 | 10 | 8 |
| 16 | 95 | 6.5 | 7.1 | 5 | 5 |
| 17 | 105 | 7.0 | 7.2 | 12 | 9 |
| 18 | 116 | 8.6 | 7.3 | 13 | 13 |
| 19 | 103 | 6.0 | 6.0 | 9 | 9 |
| 20 | 107 | 5.2 | 7.0 | 14 | 14 |
| 21 | 93 | 4.4 | 4.6 | 12 | 13 |
| 22 | 90 | 4.4 | 4.6 | 4 | 6 |
| 23 | 107 | 7.2 | 6.8 | 10 | 11 |
| 24 | 96 | 5.3 | 5.3 | 8 | 7 |
| 25 | 112 | 7.5 | 6.4 | 14 | 12 |
| 26 | 108 | 8.2 | 8.0 | 14 | 13 |
| 27 | 100 | 6.1 | 6.1 | 7 | 5 |
| 28 | 105 | 6.4 | 5.9 | 8 | 10 |
| Mean | 101 | 6.50 | 6.45 | 10.5 | 9.96 |

[a]Determined by Lorge-Thorndike (October 1973).
[b]Determined by Iowa Tests of Basic Skills, Form 3 (October 1974).
[c]Raw scores on comprehension questions.
Test 1 = Immediate recall.
Test 2 = Delayed recall.

INDIVIDUAL SCORES OF SUBJECTS IN SQ3R GROUP

| S | I.Q.[a] | R. L.[b] | V. L.[b] | Test 1[c] | Test 2[c] |
|---|---|---|---|---|---|
| 1 | 107 | 5.7 | 6.0 | 8 | 6 |
| 2 | 113 | 6.0 | 7.7 | 14 | 12 |
| 3 | 101 | 5.8 | 5.3 | 7 | 6 |
| 4 | 98 | 4.8 | 6.2 | 5 | 8 |
| 5 | 105 | 6.6 | 6.8 | 16 | 9 |
| 6 | 108 | 7.5 | 8.0 | 11 | 12 |
| 7 | 89 | 4.8 | 4.2 | 7 | 7 |
| 8 | 116 | 7.0 | 6.4 | 14 | 15 |
| 9 | 100 | 8.0 | 7.4 | 11 | 14 |
| 10 | 108 | 6.4 | 8.4 | 14 | 14 |
| 11 | 111 | 7.2 | 7.4 | 14 | 15 |
| 12 | 110 | 9.0 | 9.0 | 16 | 16 |
| 13 | 121 | 8.0 | 7.4 | 15 | 10 |
| 14 | 93 | 6.3 | 6.6 | 7 | 6 |
| 15 | 94 | 5.7 | 6.2 | 12 | 10 |
| 16 | 107 | 8.1 | 7.6 | 13 | 14 |
| 17 | 72 | 5.5 | 6.0 | 6 | 6 |
| 18 | 96 | 6.9 | 6.2 | 14 | 15 |
| 19 | 109 | 6.4 | 7.4 | 16 | 13 |
| 20 | 110 | 7.0 | 7.4 | 12 | 12 |
| 21 | 91 | 6.1 | 7.0 | 9 | 7 |
| 22 | 89 | 5.2 | 5.0 | 12 | 8 |
| 23 | 115 | 7.0 | 7.0 | 15 | 16 |
| 24 | 102 | 5.7 | 7.0 | 10 | 8 |
| 25 | 93 | 6.9 | 5.3 | 5 | 6 |
| 26 | 90 | 6.0 | 6.4 | 3 | 9 |
| 27 | 99 | 5.7 | 4.6 | 5 | 8 |
| 28 | 116 | 7.0 | 6.4 | 13 | 13 |
| Mean | 102.2 | 6.5 | 6.4 | 10.85 | 10.5 |

[a]Determined by Lorge-Thorndike (October 1973).
[b]Determined by Iowa Tests of Basic Skills, Form 3 (October 1974).
[c]Raw scores on comprehension questions.
Test 1 = Immediate recall.
Test 2 = Delayed recall.

# APPENDIX C

## READING ASSIGNMENT AND TESTING INSTRUMENT

"Over the Alps"

Two great powers of the ancient world. The city-states of Rome and Carthage were two great powers of the ancient world. Rome, in Italy, and Carthage, on the coast of North Africa, hated each other and feared each other. Finally, they went to war. Their struggles to defeat each other lasted over a hundred years.

At one point in the struggle, the Carthaginians were led by Hannibal, who was a great military leader. Hannibal had determination, strength, intelligence, and great military skill. He was more powerful than his men and could handle weapons and horses better than they. His will was strong as iron, and his men followed him without question.

Hannibal's plan. Hannibal was also a man of great daring and imagination. He knew that the Romans believed that the Carthaginians would always attack Rome from across the Mediterranean. So Hannibal decided to attack Rome by land, from the north.

Hannibal laid his plans in secret with such care that not a word leaked out to the Romans. His plan was to move his army from its base in Spain, across southern France, over the Alps, and down into Italy. His army was made up of eighty thousand foot soldiers, twenty thousand soldiers mounted on horses, thousands of pack horses, and, most amazing of all, nearly forty African elephants.

Hannibal's army marched up the coast of Spain, across southern France to the Rhone River. Since this river was large, it took the army two days to prepare for the crossing. Some of the men were taken across by boat. The horsemen swam across, leading their horses by their bridles.

And the elephants? They were carried across the river on huge dirt-covered rafts. These were over two hundred feet long and more than fifty feet wide. Some elephants became frightened on the trip. Mad with fear and trumpeting in fright, they broke their ropes and plunged into the river. However, they swam to the shore, were recaptured, and the army moved swiftly toward the Alps.

The barbarian threat. After Hannibal and his army entered the mountains, they were attacked by barbarian tribes. But men, horses, and elephants struggled higher and higher up the mountains. After several days of hard climbing, they reached a pass, over a mile and a half above sea level. The barbarians held the pass, but Hannibal's scouts found that they guarded the pass only by day.

At night, Hannibal and some of his men got through the pass. But when day came and the rest of the army was still going through, the barbarians attacked. The pass rang with the screams of dying men, the clatter of falling rock, and the neighing and trumpeting of frightened beasts caught in the battle. When Hannibal heard the sounds of battle, he and his men doubled back and drove them off.

Then the army slowly continued through the steep, rocky, snow-filled pass.

Coming down the Alps on the Italian side was even more dangerous than the climb had been. Heavy snows fell, and thousands of men, horses, and pack animals were lost. The elephants suffered greatly from the cold. Because of their great weight, many of them became trapped in the snow and died.

At one point they came to a place where the path was so narrow and the rocks so steep that the army was forced to halt. It began to snow heavily. Finally, Hannibal decided the army would have to struggle down the steep slope.

Most of the soldiers were able to slide down in the loose, new snow. But this soon was worn down to a slippery sheet of ice. Then Hannibal ordered the soldiers to remove all the snow and ice so that the horses and elephants could pass in safety. It took three days of hard labor to clear a safe path for them.

At another point they reached a place where a rock slide had blocked the way. Here, Hannibal ordered his men to cut down trees and pile them on the rocks. Then the pile was set on fire. When the rocks became hot, Hannibal ordered his men to pour vinegar on them to make them crumble. Then the soldiers broke up the rock slide with iron tools. After four days of work in the cold, the army began to march again.

Hannibal reaches Italy. Finally, fifteen days after they had begun climbing the Alps, Hannibal reached Italy. He had lost sixty thousand foot soldiers, fourteen thousand horses, and most of his elephants in the mountains.

In spite of his losses, Hannibal marched quickly to attack the Romans. He drew up his troops in a long thin line. When the Romans charged, the center of Hannibal's line fell back. Then the Romans rushed forward and the Carthaginian soldiers and horsemen on the ends of the line closed in.

The Carthaginians fought fiercely. By nightfall, more than forty thousand of Rome's best men lay bloodied and still on the battlefield. Hannibal had massacred Rome's best army.

Hannibal's defeat. Even though the army had been beaten, Rome would not give up. The Romans armed more men, and the fighting continued for fifteen years.

Then, a famous Roman general, Scipio, attacked Carthage. Hannibal left his unfinished campaign in Italy and returned home to fight.

Hannibal was beaten in battle by Scipio. Then, choosing death rather than defeat, Hannibal took poison which he always carried hidden in his ring.

So ended the life of one of the world's great military figures. But, he had made his mark in history by his military ability and by the boldness with which he carried out his plans.

## COMPREHENSION CHECK

Choose the best answer.

1. The Romans believed that the Carthaginians would

   a. never attack Rome.
   b. attack Rome from the sea.
   c. attack Carthage from the north.
   d. attack Rome from the north.

2. Hannibal planned to move his army which was based in

   a. France. b. Italy. c. Spain. d. Carthage.

3. The most unusual thing about Hannibal's army was that it had

   a. thousands of pack animals.
   b. nearly forty war elephants.
   c. twenty thousand foot soldiers.
   d. nearly twenty thousand elephants.

4. It took Hannibal two days to prepare his troops for the crossing of the Rhone River because

   a. the river was very large.
   b. of the large number of soldiers and supplies.
   c. the elephants were afraid of the water.
   d. the weather was bitter cold.

5. The rafts the army built to carry the elephants across the Rhone were

   a. more than five hundred feet long.
   b. less than one hundred feet long.
   c. about two hundred feet long.
   d. about fifty feet long.

6. Probably Hannibal's greatest problem on the trip up the mountain and through the pass was

   a. fighting off the barbarians.
   b. dodging the falling rock.
   c. finding a path.
   d. controlling the elephants.

7. Hannibal and some of his men were able to get through the mountain pass because

   a. his troops outnumbered the barbarians.

b. the barbarian guards were on duty only during the day.
c. the elephants were so strong.
d. he would not give up.

8. Coming down the Alps on the Italian side was dangerous because

a. the elephants were not used to the severe climate.
b. the passes were narrow and rocky.
c. heavy snows continued to fall.
d. the men and animals were tired and cold.

9. When the animals were stopped by a steep icy slope, Hannibal ordered the men to

a. lead the animals down another path.
b. pour vinegar on the ice to melt it.
c. remove all the snow and ice.
d. make camp and wait for the ice and snow to melt.

10. After crossing the mountains where he lost so many soldiers and animals, Hannibal decided to

a. call a halt and rest for a week.
b. march quickly to attack the Romans.
c. return to Carthage.
d. hire barbarians to fight the Romans.

11. When the Romans charged, the center of the Carthaginian line fell back in order to

a. regain strength.
b. allow the ends to close in on the attacking Romans.
c. massacre the Romans from the middle.
d. get more ammunition and supplies.

12. Hannibal's massacre of the Roman army showed that

a. Hannibal was a great military leader.
b. troops should never rush forward without a command.
c. a battle cannot be won without horsemen.
d. elephants are not needed in battles.

13. After the massacre ended, the Romans

a. retreated to bury their dead.
b. surrendered to Hannibal.
c. fled into the mountains.
d. rearmed and continued to fight.

14. Hannibal's trip over the Alps to Italy took

a. just over two months.
b. more than three weeks.
c. about three days.
d. about fifteen days.

15. In the long climb across the Alps Hannibal lost

a. 6,000 men.
b. 60,000 men.
c. 600,000 men.
d. more than 60,000 men.

16. Hannibal ended his military campaign in Italy when

a. he knew that he would never defeat the Romans.
b. too many of his men had been killed.
c. Carthage was attacked.
d. he took poison.

17. Finally Hannibal was defeated in battle by

a. a Roman general named Scipio.
b. the fierce army of barbarians attacking from the north.
c. his own men who turned against him and betrayed him.
d. the Carthaginian foot soldiers.

18. Hannibal's death by poison showed that he

a. was so proud that he could not bear to lose.
b. was afraid of being captured by the Romans.
c. was afraid to face his men after being defeated.
d. wished he had been killed by the Romans.

19. The main idea of this story is that Hannibal was a great general who

a. crossed the Alps with a big army and defeated the Romans.
b. fought the Romans bravely but lost in the end.
c. is remembered for his military skill and bold, unusual methods of warfare.
d. is remembered because he tried to take forty elephants over the Alps.

20. The struggle of Rome and Carthage to achieve military superiority lasted

a. over 100 years.
b. almost a century.
c. ten years.
d. fifty years.

# ANSWER SHEET

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# THE EFFECT OF DRA AND SQ3R ON THE IMMEDIATE AND DELAYED RECALL OF SEVENTH-GRADE SOCIAL STUDIES MATERIAL

AN ABSTRACT OF A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS

THE STATE UNIVERSITY OF NEW JERSEY

BY

ROBERTA H. GARTY

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REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

COMMITTEE CHAIRPERSON: Joseph Zelnick, Ed.D.

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## ABSTRACT

The purpose of this study was to examine the effect of the study organizers, DRA and SQ3R, on the immediate and delayed recall of social studies material.

Eighty-four seventh-grade students from an intermediate school in a regional school district participated. These subjects were placed into three experimental groups, DRA, SQ3R, and control, by the use of a table of random numbers. The testing instrument was an EDL Controlled Reading Lesson which had been adapted with additional questions and headings. Before the research began, a pilot study was conducted, and the reliability of the instrument was determined by the application of a rational equivalence formula.

While the DRA and SQ3R groups scored numerically higher than the control group on tests of immediate recall and delayed recall, an analysis of variance applied to these results did not yield statistical significance.

In order to check the interactions of intelligence and reading level, the three experimental groups were divided into the top 27% and the bottom 27% by I.Q. and reading level. An analysis of variance applied to the top 27% and the bottom 27% of the groups arranged according to intelligence yielded no significance. An analysis of variance computed for the top 27% and the bottom 27% of the groups arranged according to reading level resulted in

significant findings on the test of delayed recall for the bottom 27% of subjects.

t Tests were used to determine significance between the means of the two experimental and the one control group arranged by reading level. The results of the t tests showed significance for the bottom 27% of the DRA group arranged according to reading level at the .01 level of confidence.

The results of the study indicated that the DRA technique was an effective organizer of seventh-grade social studies material for the poor readers of this group. Recommendations for further research include the use of a larger population and an extended practice period to reinforce the learned skills.